US Army Corps of Engineers®
Engineer Research and Development Center

Navigation Systems

Monitoring of Concrete Navigation Structures

Problem

Maintenance of aging infrastructure is a challenge in the effort to keep inland navigation systems operable. The inability to accurately predict levels of deterioration and damage to structural concrete components hinders the efficient use of funds for preventive measures. Instead, resources are often allocated to fix problems after they have occurred and possibly imposed a negative effect on the navigation system. Additionally, innovative techniques are needed to detect and quantify the extent of existing damage and to effectively repair problem areas. The Upper Mississippi River Navigation system is a good example as district engineers have identified that major concrete problems exist at locks 18, 19, 20, 21, 22, 24, and 25. Also, major problems are obvious at Lagrange Lock on the Illinois River. There have been various levels of rehab to all of the locks over the years, most of which are over 60 years old. Additional material evaluation is needed, as well as ways to assess the condition of the concrete deep within the structures.

Research Approach

The technical objective is to develop engineering procedures for monitoring and assessing the condition of concrete navigation structures. Specifically, the goal is to be able to detect deterioration, identify causes, assess serviceability levels, predict future performance, and effectively schedule maintenance and repair activities. NDT procedures are being developed for assessing damage. Material specimens are being evaluated.

Labs/others involved

Geotechnical and Structures Laboratory, Coastal and Hydraulics Laboratory, Information Technology Laboratory, Rock Island District, and St. Louis District.

Final Products

Procedures as given in Tech Notes describing the capabilities and application of the NDT methods investigated.

Point of Contact

Dr. Stanley C. Woodson, ATTN: CEERD-GS-R, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199, (601) 634-2479, (Stanley.C.Woodson@erdc.usace.army.mil